REMARKS

In response to the Office Action mailed July 8, 2008, Applicants respectfully request reconsideration. Claims 1-7 were previously pending in this application. Claim 1 has been amended herein. As a result, claims 1-7 are pending for examination with claim 1 being the sole independent claim. No new matter has been added.

Rejections Under 35 U.S.C. §102

The Office Action rejected independent claim 1 under 35 U.S.C. §102(b) as purportedly being anticipated by Chiang (U.S. Patent No. 4,576,900). Applicants respectfully request reconsideration.

Chiang describes a multi-level interconnect system for an integrated circuit. FIG. 23 of Chiang shows that a wire 595 is bonded to a bonding pad 581, which is shown crosshatched. A second crosshatched region is shown in the same level as bonding pad 581, on the right side of FIG. 23. The second crosshatched region is not labeled with a reference character. As shown in FIG. 23 of Chiang, bonding pad 581 and the unlabeled crosshatched region (right side) both have the same thickness in the vertical dimension of FIG. 23. On page 2, the Office Action states that it is relying on the "horizontal thickness" of bonding pad 581 as purportedly being the thickness recited in Applicants' claim 1.

By contrast, claim 1, as amended, recites *inter alia*, that the metal contact pads have a first length, a first width, and a first thickness, the first thickness being the distance from a bottom of the metal contact pads to a top of the metal contact pads, wherein the first length and the first width are greater than the first thickness, wherein the metal conductive strips have a second thickness along a same direction as the first thickness, wherein the first thickness of the metal contact pads, at least for portions of the metal contact pads that are not covered by the passivation layer, is smaller than the second thickness of said conductive strips, wherein the second thickness is at least twice as large as the first thickness.

The Office Action relies upon the horizontal dimension of FIG. 23 of Chiang as purportedly being the thickness direction of Applicants' claim 1, however, under this interpretation, Chiang does not meet the limitation of claim 1 that the length and width of the metal contact pad are greater than the thickness of the contact pad. Rather, as shown in FIG. 23 of Chiang, the vertical dimension of bonding pad 581 is smaller than the horizontal dimension.

Therefore, the thickness direction of the contact pad is not along the horizontal dimension of FIG. 23 of Chiang. Using the vertical dimension of Chiang as the thickness dimension, Chiang fails to teach or suggest that a first thickness of the metal contact pads, at least for portions of the metal contact pads that are not covered by the passivation layer, is smaller than the second thickness of said conductive strips. Chiang also does not suggest that second thickness of the conductive strips is at least twice as large as the first thickness of the metal contact pads. Rather, FIG. 23 of Chiang shows that bonding pad 581 and the unlabeled cross hatch region (right side) both have the same thickness in the vertical dimension of FIG. 23. For these reasons, claim 1 patentably distinguishes over Chiang. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 2-7 depend from claim 1 and patentably distinguish over Chiang for at least the same reasons.

Rejections Under 35 U.S.C. §103

I. The Office Action rejected independent claim 1 under 35 U.S.C. §103(a) as purportedly being unpatentable over Sahara et al. (U.S. Patent Publication No. 2002/0063340). Applicants respectfully request reconsideration.

The Office Action concedes that Sahara et al. does not disclose that the entire thickness of metal contact pads 22 are smaller than conductive strips 23 and 25. However, the Office Action alleges that the claim limitation is purportedly *prima facie* obvious because dimensional limitations are purportedly obvious, absent a showing of unobvious purpose, unexpected result, etc. (citing various CCPA cases). Applicants respectfully disagree because the Office Action has failed to set forth a *prima facie* case of obviousness. To establish a legally-sufficient *prima facie case* of obviousness, both the MPEP and federal circuit caselaw require factual findings about the scope and content of the prior art, and the articulation of some rationale as to why the invention would have been obvious to one of ordinary skill in the art.

MPEP 2142 states:

> The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in KSR International Co. v. Teleflex Inc., 550 U.S. ___, ___, 82 USPQ2d 1385, 1396 (2007) noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Federal Circuit has stated that

> "rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." In re Kahn, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006).

The Office Action has failed to meet its burden of establishing a prima facie case of obviousness. In particular, the Office Action concedes that certain limitations are not present in Sahara, yet the Office Action has not provided any rationale as to why it would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Sahara et al. to include the missing limitations. The rejection is therefore improper.

Furthermore, Applicants' specification provides ample evidence as to the significance of the thickness limitations of claim 1. Claim 1 recites, *inter alia*, that "the first thickness of the metal contact pads, at least for portions of the metal contact pads that are not covered by the passivation layer, is smaller than the second thickness of said conductive strips. As described in the specification on pages 1 and 2 and illustrated in FIGS. 2 and 3, welding a metal wire to a contact pad can cause reliability problems because cracks 22 and projections 23 can cause short circuits. The present application further states:

> The present inventor has determined the origin of the above-mentioned reliability problems for high-density circuits. They are due to an increase in the thickness-to-width ratio of the contact pads. Indeed, to reduce the surface area taken up by conductive strips, while maintaining a resistivity which is as small as possible, the thickness of the metal layer is increased. Further, the decrease in the contact pad width also contributes to increasing the thickness-to-width ratio, which enhances reliability problems.
>
> A decrease in the metal layer thickness can only be envisaged with difficulty since this would increase the resistivity of the conductive strips. The use of a material more conductive than aluminum, such as copper, would however make welding operations more difficult.
>
> To solve these problems, the present invention provides placing on the last metallization level of an integrated circuit "thick" metal conductive strips and "thin" contact pads. (Page 4)

As should be appreciated from the above-cited portions of the specification, the inventor appreciated that the thickness of the contact pads can cause the above-mentioned reliability

problems. Sahara makes no mention whatsoever of the thickness limitation of claim 1, and provides no reason that one of ordinary skill in the art would have made such a modification. Therefore, claim 1 patentably distinguishes over Sahara et al. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 2-7 depend from claim 1 and patentably distinguish over Sahara et al. for at least the same reasons.

II. The Office Action rejected dependent claims 6 and 7 under 35 U.S.C. §103(a) as purportedly being unpatentable over Liu et al. (U.S. Pat. No. 6,358,831) in combination with Huang et al. (U.S. Pat. No. 6,815,324). Applicants respectfully traverse these rejections.

Liu describes a method for forming a top interconnection level and bonding pads. The background section of Liu describes forming wires 26 and a bonding pad 24 from the same metal layer 25 (Col. 2, lines 8-23). Liu states that chemical-mechanical polishing is used to polish the substrate wafer, and the surface of the metal bonding pads tend to become dished. Liu states that this dishing weakens the bonding pad, causing a subsequently attached wire bond to be mechanically weak and excessively resistive (Col. 2, lines 20-26).

Huang states that an aluminum contact pad can acquire a bump or mark due to repetitive contacting of the aluminum contact pad by a tester probe (Col. 10, lines 18-22). Huang describes etching the aluminum contact pad to remove the bump (Col. 10, lines 30-36).

The Office Action alleges that it would have been obvious to etch Liu's bonding pad to be smaller in thickness to remove a probe mark or bump as described by Hwang. Applicants respectfully disagree because Liu teaches away from reducing the thickness of the bonding pad. Liu states that reducing the thickness of the pad makes the pad mechanically weaker, and increases the resistance of the pad (Col. 2, lines 20-26). Because Liu states that reducing the thickness of the bonding pad is undesirable, one of ordinary skill in the art would not have modified Liu's bonding pad to reduce its thickness. Accordingly, claims 6 and 7 are not obvious in view of Liu and Huang, and withdrawal of these rejections is respectfully requested.

CONCLUSION

In view of the foregoing, the present application is believed to be in condition for allowance. A Notice of Allowance is respectfully requested. The Examiner is requested to call the undersigned at the telephone number listed below if this communication does not place the case in condition for allowance.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, the Director is hereby authorized to charge any deficiency or credit any overpayment in the fees filed, asserted to be filed or which should have been filed herewith to our Deposit Account No. 23/2825, under Docket No. S1022.81126US00.

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Respectfully submitted,

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